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ABSTRACT

Instruction is provided on the use of the Keller plan, a structured, self-instructional, self-paced method, to teach introductory logic to undergraduates. First, an overview of the Keller plan is presented, indicating that students work through units of course material on their own, at their own pace, and when they feel prepared to exhibit that they have mastered a certain portion of the material, they take a test on it during regularly scheduled class periods. Next, reasons for teaching logic in a non-traditional format are discussed, followed by an explanation of the course structure. Advantages of the format are summarized next; e.g., students are allowed to work at their own pace, students receive personalized attention focusing on their particular difficulties, the method alleviates common test anxiety, the method promotes self-discipline and study skills, and large course enrollments can be easily handled by one instructor. Next, three drawbacks for the instructor are discussed: (1) many examinations must be composed; (2) the course is paper-intensive; and (3) grading must be done every day. The paper includes a course syllabus for an introductory logic course, data on student evaluations of the course for three terms, and sample unit tests. (EJV)

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TEACHING INTRODUCTORY LOGIC IN THE SELF-PACED KELLER FORMAT

by
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Paper presented at the Conference on
Critical Thinking Skills in College Academic Enrichment Progams
Los Angeles, California
February 5-6, 1987

JC 870 155

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TEACHING INTRODUCTORY LOGIC
IN THE SELF-PACED KELLER FORMAT

Workshop presented at Critical Thinking Skills in College Academic Enrichment Programs Conference, Los Angeles, February 5-6, 1987

Having taught introductory logic for nine years at both Dartmouth College and Ohio University, I have come to the view that, on the whole, logic lectures are regretably ineffective and inefficient, boring to a non-quantifiable degree, and deserve the scorn heaped on them by students and the avoidance shown them by many teachers. I do not give them any more, even though I teach logic every term, and think that it is essential to a college education. In this workshop I will present an alternative to the usual lecture-quiz-exam format. The strategy is sometimes called the Keller plan, and it is a structured but self-instructional and self-paced course which has worked extremely well with students of very mixed abilities, but is perhaps most successful and enjoyable for the bright and well-motivated student, the honors student. Before delving into the details and the motivation behind the system, let me, in the sketchiest way indicate what is involved. Students work through units of course material on their own, and at their own pace, and when they feel prepared to exhibit that they have mastered a certain portion of the material, they take a test on it during regularly scheduled class periods. Described at this level, the strategy admittedly sounds like the very worst of all possible alternatives, but I hope that the benefits and the fun of this plan will become clear as we discuss the details. First, though, let me speak to the motivation behind teaching logic in a non-traditional format.

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Motivation

1. Lectures are difficult to keep stimulating to students. Trotting through problem after problem is repetitous and a sure way of dissipating the energy and attention level of the class. Examples must be colorful, timely, and interesting, and not the usual contrived stuff like, 'All turtles are amphibians' , but there always is pressure toward the contrived, because of the demand for clarity and the constraints of time. Say you have solved these sorts of problems. Still there is the inevitable problem that no matter how high or low you may "pitch" you lecture, no matter how breezy or plodding you're style, you will inevitably be wasting the time of a significant proportion of your students. There are those who understand the material or techniques you are covering from their reading, and after one problem they've got it, and are bored for the remaining forty minutes. On the other hand, there are those students who after the first five minutes of lecture haven't a clue to what you're doing, give up for the rest of the lecture and say to themselves, "I'll figure it out when I read it at home". There is, it seems to me, lots of wasted time inherent in the lecture format, because of the great likelihood that individual students are for one reason or another out of synch with the pace of the lecture. When we add to these points the fact that it is improbable that a lecturer will state the points as clearly in front of the class as they are stated in a well written text, (as few of them as there are), it is clear that the obstacles to successful logic lecturing are formidible. My plan is to let the student learn the material through the text, and to free up the student-faculty contact time so that personal attention can be given to each student's particular problems.

Course Structure

Well, how does one organize a course that permits each student to work at his or her own pace, take tests when they feel like it, and talk to the teacher one-to-one about their problems without creating either chaos or and administrative nightmare? The solution, in general, is to allow for a lot of student freedom within a clear and very firm external or overarching structure. And how is test-taking supposed to be a learning improvement over lecture-going? The idea is to give the student more than one opportunity to show that he or she has mastered certain of the course material, and therefore have the students come to view the tests as a learning tool, rather than simply as the teacher's way to grade performance.

Page 1 of the included syllabus explains the basic workings. The course covers informal, syllogistic and propositional logic through natural deduction with conditional and indirect proof. I have divided the material, which is the bulk of the first seven chapters of Patrick Hurley's Concise Introduction to Logic, into thirteen units, each of which can be tested easily within an hour's time. For each of these units, I have written three very similar tests. The tests for Units 3 and 8 have been provided here as samples. Our ten week terms contain approximately 40 class periods in which the student can take a test. Since the object of the course is for the student to master the material in the thirteen units, the student's final grade is determined, not by the number of tests he or she takes, but by the number of units they pass. Tests are graded either P or N, "Pass" or "No Pass". 'Pass' here, does not mean an adequate performance, but rather, something close to mastery of the material. More than two mistakes on a test is usually sufficient for an N. With three chances to pass each unit,

the student is encouraged to continue work on the material until mastery is achieved. The "sights" of the course, so to speak, can be higher than usual, pitched at near-mastery, because of the multiple chances the student receives. There is, as a matter of fact, very little griping that we expect too much of the student.

Since each student is progressing at their own rate, and since it is up to the student to decide how many test they take a week, and on which days they take the test, I or my tutor arrive at each testing session with the correct test for each student, even though, on the average, only one third of the class takes a test on any given day.

The tests are graded each day, and the results are posted by 4 pm for the students. Students receiving a P simply go home and begin work on the next unit. Students receiving an N drop in sometime between 4 and 5 to discuss their test with me or the tutor. This discussion period is the most interesting and dynamic part of the course -- and the most fun.

I encourage students to spread their arrivals across the hour, so no one has to wait very long to chat with us. In practice, it takes only five or six minutes in most cases to get the student clear about their mistakes, and top send them on their way. I am in the habit of writing the correct answers on each test so that if the student must wait for a few minutes to talk to me or to the tutor, they can begin to figure out their errors. Quite often, the student reads the corrections, says, "I can't believe I made that mistake", and needs no further attention. They come in the next test day and pass the unit.

I try for a very casual, sociable, and high energy session, joking with the students about their mistakes, goading them on, and in general keeping them motivated to progress. Because the discussion period gives me a few

minutes with each student one on one, I also can effectively monitor their problems, attitude, and motivation, and this makes for very little alienation or resentment toward the course's unusual character.

As I mentioned, a student's final course grade is a function of the number of units of material passed , and that function is indicated on page 4 of the supplementary material. Obviously, this can be adjusted, but I have found the one presented to be successful. If you look for a moment at the replies to question 11 of the course evaluation included here (page 7 of the supplement) you'll see students' opinion. (When the students think you're being a little too strict, you're probably right on the money!)

I said that the freedom which this style of teaching affords to the student is kept from developing into anarchy and chaos by a well defined structure in which the freedom is offered. Most of that structure is expressed by the set of rules given on page 3 of the supplement. Inevitably students will ask for special opportunities for test taking, or ask whether they can't take two tests on one day. Except in cases of extended sickness, I make no exceptions.

The three tests associated with each unit are given in random order to each student. Three tests appear to be enough to sufficiently confuse the students, so that there is not much "leakage " of information or any cheating, really, as far as I can determine. Of course, this would not be the case if tests were allowed to be removed from the classroom, so this is prohibited. Last year, I instituted the policy of allowing the students who have gone through the 13 units with time to spare, to return to any unit they failed to pass and retake tests on those units, thereby giving them a further opportunity to improve their grade. Many students have taken advantage of this, and all think its a great idea. It acts as a reward

for getting through all the units, a reward that is not available to the less motivated student who lowers his sights and doesn't try to get through all the units.

This point brings us to a question. How do you stop a student who , say, needs to take logic, hates the idea, would be happy with a C-, and decides to manipulate the self-paced system by showing up for very few tests and not even attempting the later material. My course satisfied a University core requirement for quantitative skills, so it is important that a mechanism is in place to insure the students at least expose themselves to most of the material in the course. This is the point of restriction 8, the 21- test- or- Unit -11 rule (cf. supplement, p. 3).

This penalty keeps students working at a good rate through the term. Always flexible, however, I do allow the students to end the course in the ninth week if they have passed the 21 test/Unit 11 requirement, and they are happy with the grade achieved to that point. Of course, students who have passed all 13 units in less than the nine or ten weeks are simply done early and have an A in the course.

Advantages of Format

I'll already indicated, I suppose, many of the advantages which Keller plan logic instruction enjoys. Let me just summarize them now.

1. Allows the student to work at his or her own pace, being neither intimidated by better students or held back by slower ones.

2. Gives each student personalized attention to their particular difficulties; their problems are very efficiently addressed.

3. Provides maximum flexibility to the student in regard to use of their time. Many of my students, e.g. work hard the week before midterms, and then take a midterm week hiatus from logic to concentrate on their

other exams.

4. Alleviates the common test anxiety associated with logic courses. There are no cumulative exams in the course, and the student comes to view tests in a different light. Some of my students come in for their first test on a given unit before they have fully mastered the material, just to see what the tests will be like. This is an acceptable strategy.,

5. Promotes self-discipline and study skills.

6. Because of multiple test opportunities, the course objective can be mastery of the material, rather than merely adequate comprehension.

7. Successful students cover more material, master it better, and finish faster than in traditional sections of the same course. One student last term was done, with an A, in five and a half weeks.

8. Student-teacher exchanges are excellent; discussion sessions are very comfortable for everyone.

9. Enrollments of 65-70 can be handled easily by one instructor, or very efficiently indeed with one instructor and a tutor, since on average only a third of the enrollment participates on any given day.

Drawbacks

There must be some drawbacks, you're saying. There are basically three: (1) when gearing up, you must compose a lot of exams: I needed to write thirty-nine. A computer was a great help, and I was done in two weeks, working on and off. (2) The course is paper-intensive: you must have a bank of blank tests. (3) You must grade tests each day. But after use and refinement of your test bank for a few terms, you are so familiar with the tests that grading is very fast. It's particularly fast if you have a tutor or graduate assistant doing the grading. My assistant grades

almost all the tests, and after two quarters, spends no more than an hour a day grading.

You may think that it is a drawback having both a testing and a discussion period, this requiring twice the student contact hours as a lecture format. Remember, however, that there is no lecture preparation, and the scheduled discussion period substantially reduces the number of students looking for help during other times, such as one's office hours. All things considered, this format is a very efficient way to teach logic, and a very efficient use of both student and faculty time.

But Do they Like It?

There are, of course, the few students for whom this is all too much freedom, with not enough in the way of external threats or prodding. But I give significantly fewer low grades and Fs with this method than are given in the other, traditionally runs sections of the course which our department offers. You can see by examining the figures on the evaluation questionnaire in the supplement that, by and large, students find the course very successful, and appreciate its innovations. For the excellent student, the self-paced, self-instructional format is a boon. But in addition, many students with Logic Angst have performed well in this format having previously failed the traditionally structured course. The answers to questions 12 through 16 give a good measure of student satisfaction.

Let me conclude with one caution: because students work through the material on their own, the selection of text is of crucial importance. Simple and clear exposition, as well as a large number of exercises seem to be the most important criteria. Books with supplementary study guides

and extensive answer keys to exercises should be sought out. Although I have a number of reservations about the Hurley text, I find that it works well in my situation, involving students of quite diverse abilities. A class of honors students may easily be able to handle a book of greater sophistication. At Dartmouth, we used a combination of I. Copi's Introduction to Logic and The Logic Book, Jim Moor, Merrie Bergmann and Jack Nelson's text, and in ten weeks the students covered informal logic, syllogistic and propositional logic, propositional calculus and quantification theory.

So, if you're having trouble facing the prospect of giving still another lecture of Venn diagrams, or on Conditional Proof, if you're tired of worrying that one day in mid lecture you're simply going to forget how the hell the square of opposition works, or if you're simply looking for a better and more pleasureable way of teaching your students how to think, I recommend this system to you.

John Bender
Assistant Professor
Ohio University

THE PRINCIPLES OF REASONING

Self-Paced Section
Philosophy 120

Winter 1987
Gordy 313
12-1pm MTWTH(F)
4-5pm MTWTH(F)

Professor John Bender
302B Gordy M-Th 2:30-3:00
Ms.Cathy Campbell
206 Gordy

I. Personalized System of Instruction

This section of Logic 120 is special, and is quite different from the other sections offered, although the same material will be covered. Unlike those sections, and perhaps unlike any course you have taken, this section of The Principles of Reasoning is taught on a system of personalized instruction, sometimes called the "Keller Plan", which allows you to learn at your own rate. Here is the way this method works:

The course is divided into 13 units. Your final grade for the course is determined by the number of units which you pass during the term. You begin by reading and studying the first unit and by working out exercises in the text until you become proficient with the concepts presented. We will be happy to help you with any trouble that you may be having. When you are satisfied that you have mastered the material, you take a test on that unit. The tests will be administered at 12:10 in this room on MTWTH of most weeks. (However, there are a few exceptions: tests will be administered on some Fridays. See the schedule attached.) The tests are graded on a pass (P) or no pass (N) basis, where pass indicates mastery of the material. If you fail the test, your grade is not lowered, but you must take another test on that unit until you pass it, or have failed three tests on that unit. You then move on to the next unit.

Your test will be graded by 4 p.m. on the day you took it, and the P/N results will be posted against your ID number on the wall inside Gordy 313. Drop into Gordy at that time and check the results. If you have passed, you may simply go home and begin to study the next unit. If you have not passed, then you should stop into 313 to look over your graded test and talk to one of us during the 4-5 p.m. discussion period. You may walk in at any time between 4:10 and 5, (it's actually better if everyone does not come in exactly at 4:10), and one of us will discuss your test with you one-on-one. This way, we can focus exactly on your particular problem, and in most cases in a matter of minutes you will be done and free to leave. Tests are not to be removed from the room.

There are three very clear advantages to this method of learning. First, you determine (within certain limits, of course) how much you get out of the course and what your grade is. The more you work, the more you learn and the higher your grade is. Secondly, you have a maximum chance at success because you learn at your own rate. You are neither held back by slower students nor intimidated by faster ones. Your time is not wasted sitting through lectures which are going either too slow or too fast for you. Third, you are done with the course as soon as you have passed the 13 units. Theoretically, this could occur as early as the end of January!

Initially, this method of learning may seem somewhat strange to you. Tradition from grade school through college seems to dictate that courses must be taught by using lectures. But there is good evidence that students learn more about logic and do it faster, more thoroughly, and more enjoyably under this modular learning system than under the more familiar lecture-exercise-exam format. (Just think: no cumulative exams to sweat!) The text for this course, and the study guide which we recommend are very readable and contain many examples and exercises. It is very difficult for a lecturer to present the material in as thorough and orderly a fashion. Therefore, it is important to undertsnad the reversal in the traditional roles of the teacher and textbook. The textbook becomes the "lecturer" and the teacher is freed to help the student where he or she really needs help.

The administrative features of the course might appear complicated at first, but actually they are very easy to get used to, and create a routine which is very "student-friendly". The routine is: take a test at 12 when you're prepared; find out your posted grade at 4, and talk to us sometime between 4 and 5 if you haven't passed. That's it!

II. <u>Tests and Grades</u>

The term has 40 tests days, not counting the first day of class. With 13 units to pass for an "A", you can see that you can get an "A" even if you have failed on your first or second attempt to pass a unit. The usual MTWTH test schedule has the following exceptions **Make Note of These:**

Fri. Jan. 9: Test opportunity
Thurs. Jan. 15: Martin Luther King Day NO CLASS
Fri. Jan. 16: Test opportunity
Mon. Feb 16: Lecture on Implication Rules at 12:10. No Test today.
Fri. Feb 20: Test opportunity
Mon. Feb. 23: Lecture on Replacement Rules at 12:10. No Test today.

Fri. Feb. 27: Test opportunity
Mon. Mar. 2: Lecture on Conditional Proof at 12:10. No Test today.
Fri. Mar. 6: Test Opportunity
Mon. Mar. 9: Lecture on Indirect Proof at 12:10. No Test today.
Fri. Mar. 13: Test Opportunity.
Wed. Mar. 18 at **12:20**: Last Test Opportunity (during scheduled Final exam period.)

Make-up tests will be permitted only in very exceptional circumstances. You should assume you might miss a few test days during the term due to illness, religious observance, or other reasons and plan accordingly.

To insure fairness and to prevent general chaos, some simple rules for taking tests are enforced. There are no exceptions.

1. Units must be taken and passed in order.
2. A student may take at most one test a day.
3. A student may take a test only at the scheduled hour.
4. Tests must be completed within the class time
5. Tests must not be removed from the classroom, copied, or distributed to others.
6. Students are expected to continue to work on the material until they have completed the 13 units or have run out of test days. We hope and expect that every student should at least attempt tests on each of the units.
7. Students completing unit 13 with test days to spare may retake tests on units they did not pass originally.
8. **IMPORTANT POLICY: Unless you have passed all 13 units in fewer attempts, you must, by the end of term, have taken at least 21 tests OR at least be working on unit 11. You have not been working hard enough if you haven't satisfied at least one of these conditions. You will be penalized one-half grade for every two tests fewer than 21 you have taken, or for each unit you are behind unit 11.**
9. If at the end of nine weeks (March 6) you have satisfied the 21 test/Unit 11 requirement, and are happy with your grade to date, you may stop taking tests and use the last week to prepare for other finals.

Keeping the above requirements in mind, here is the Grading Schedule:

Number of Units (not tests) Passed	Grade
13	A
12	A-
11	B+
10	B
9	B-
8	C+
7	C
6	C-
5	D
4	F
3	F
2	F
1	F
0	F

The exact number of correct answers needed for passing a test will vary from unit to unit, but the general principle is that in order to pass, you must demonstrate near mastery of the test material. Occasionally a "P-" will be given, in which case you should check with us about your test. If you can satisfy us in conversation that your mistake was only a "goof" you will receive a "P". If not, or if you do not inquire about your test, the grade will revert to an "N". Of course, if you receive an "N" on a test you certainly should talk to us.

III. Additional Comments

One of the nicest features of a course with this format is that the student has the freedom and the responsibility to construct a study strategy which best suits his or her schedule. For example, if you study hard you could be done with the course before midterm, and use the remaining time on your other courses. On the other hand, you might adjust your schedule so that you take some free time in the middle of the term to devote to exams and papers in other courses. The major pitfall is **procrastination! You must be a self-starter.** Pick a strategy and get started. (Try a test tomorrow.) With 13 units and 10 weeks you should average 1 1/2 units passed per week. Some weeks you'll need more time on one unit, other weeks you should be able to progress more rapidly. Many students find the material in the last 4 units harder than earlier material. Keep this in mind when you sketch out your plan. On the following page an even schedule, ending in an "A", is suggested. This is only a guideline, however, and your actual pace may vary from this.

IV. Suggested Schedule and Reading Assignments

Unit	Topic	Assignment in Hurley (Chapter and section)	Suggested number of test days allowed and beginning date
1	Recognizing Arguments	1.1 & 1.2	(2) Jan. 7
2	Deduction, Induction, Validity, Soundness	1.3 - 1.6	(3) Jan. 9
3	Informal Fallacies	3.1 - 3.4	(3) Jan. 14
4	Categorical Propositions	4.1 & 4.2	(2) Jan. 19
5	Categorical Syllogisms	5.1	(3) Jan. 21
6	Reducing Number of Terms; Standard Form	5.4 & 5.5 (4.8 is recommended)	(2) Jan. 28
7	Venn Diagrams & Rules	4.6, 5.2 & 5.3	(3) Feb. 2
8	Symbolization for Propositional Logic	6.1 & 6.2	(3) Feb. 5
9	Truth Tables	6.3, 6.5 & 6.6	(3) Feb. 11
10	Rules of Implication for Propositional Logic	7.1 & 7.2	**Lecture Mon. 2/16** (4) Feb. 18 **TestOp.Friday 2/20**
11	Rules of Replacement	7.3 & 7.4	**Lecture Mon. 2/23** (3) Feb. 24 **Test Op. Fri. 2/27**
12	Conditional Proof	7.5	(4) Feb. 27 **Lecture Mon. 3/2** **Test Op. Fri. 3/6**
13	Indirect Proof	7.6 & 7.7	(4) Mar. 6 **Lecture Mon. 3/9** **Test Op. Fri. 3/13**

Last Test Op: Wed. 3/18 at 12:20

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V. Assigned Textbook

All of the assigned reading is from Patrick Hurley's **A Concise Introduction to Logic**, Second Edition, Wadsworth Publishers 1985. Both bookstores in town have this volume. For this self-paced section we highly recommend Robert Burch's **Study Guide for Hurley**, 2nd ed. It contains more problems, and answers to more of the problems in Hurley.

Evaluations From 3 Terms. Total Responding: 60
(Winter, Spring, Fall 1986)

EVALUATION QUESTIONNAIRE FOR
SELF-PACED LOGIC 120

AS YOU KNOW, YOU HAVE PARTICIPATED IN AN EXPERIMENTAL SECTION OF LOGIC 120, AND WE'D APPRECIATE IT IF YOU'D TAKE OF FEW MOMENTS TO INDICATE YOUR REACTIONS TO AND EVALUATION OF THE COURSE.

Please circle one of the answers provided for the following questions.

1. **The course was well organized and evenly scheduled.**
(1) = 0 (2) = 0 (3) = 20 (4) = 40
strongly disagree somewhat disagree somewhat agree strongly agree

2. **The tests fairly reflected the material studied and fairly measured your mastery/lack of mastery of that material.**
(1) = 0 (2) = 6 (3) = 20 (4) = 34
strongly disagree somewhat disagree somewhat agree strongly agree

3. **Having three chances to pass each unit is a good idea.**
(1) = 0 (2) = 1 (3) = 5 (4) = 54
strongly disagree somewhat disagree somewhat agree strongly agree

4. **Hurley's text and Burch's study guide are well written and organized, and worked well in this self-paced program.**
(1) = 0 (2) = 10 (3) = 28 (4) = 22
strongly disagree somewhat disagree somewhat agree strongly agree

5. **The afternoon discussion period worked efficiently and clarified your problems satisfactorily**
(1) = 1 (2) = 7 (3) = 23 (4) = 25
strongly disagree somewhat disagree somewhat agree strongly agree

6. **When you discussed your test with Professor John Bender, you found his explanations clear and helpful.**
(1) = 0 (2) = 2 (3) = 20 (4) = 38
strongly disagree somewhat disagree somewhat agree strongly agree

7. **When you discussed your test with [redacted] you found her explanations clear and helpful.**
(1) (2) (3) (4)
strongly disagree somewhat disagree somewhat agree strongly agree

8. **When you discussed your test with [redacted] you found his explanations clear and helpful.**

her

(1) strongly disagree (2) somewhat disagree (3) somewhat agree (4) strongly agree

9. **The supplementary lectures during the final four weeks are helpful and a good idea.**

(1) = 1 (2) = 2 (3) = 30 (4) = 20

strongly disagree somewhat disagree somewhat agree strongly agree

10. **The number of units in the course was:** (1) far too many; = 4

21 = (2) somewhat too many; (3) just right: (4) somewhat too few;

(5) far too few. 33 2 0

11. **The schedule of final grades (what grade you receive for the number of units passed) is:** (1) far too lenient; (2) somewhat too = 3

lenient; (3) quite fair; (4) somewhat too strict; (5) far too strict

43 12 1

12. **Do you think that you learned the course material as well/not as well as you would have in the usual lecture/quiz/exam format?**

2 = (1) nowhere near as well as in usual format; (2) somewhat less well; = 13

12 = (3) about as well; (4) somewhat better than in usual format; = 19

(5) much better than in usual format. = 13

13. **Your evaluation of your experience in this course, when comparing it to other introductory quantitative courses is:** (1)

2 = much lower than average; (2) somewhat lower than average; (3) average; = 19

(4) somewhat higher than average; (5) much higher than average.

21 13

14. **You found your overall experience with this self-paced logic course:**

(1) poor; (2) fair; (3) average; (4) good; (5) excellent.

4 6 9 24 16

15. **You would recommend this special section of Philosophy 120 to another student:** (1) never; (2) with reluctance; (3) indifferently;

(4) definitely; (5) with enthusiasm.

17 32

16. **You think that the Philosophy department should continue to offer their 120 students the alternative of a self-paced section:**

(1) strongly disagree (2) somewhat disagree (3) somewhat agree (4) strongly agree

0 3 10 46

WRITTEN COMMENTS ARE EVEN MORE IMPORTANT THAN NUMERICAL EVALUATIONS. WE'D APPRECIATE YOUR INPUT.

17. **Recommendations for changes in the schedule:**

18. **Recommendations for changes in the grading system:**

19. **Comments/Recommendations concerning the Books:**

20. **Comments/ Recommendations concerning the Tests (their content, their number, etc.) Keeping in mind that you move onto the next unit by passing or by taking all available tests in the previous unit, how many tests per unit should be offered?**

21. **Comments/Recommendations concerning the Discussion section.**

22. **Any Other Comments/ Recommendations:**

LOGIC 120 TEST

Unit 3

Name _____

Date _____

IDENTIFY THE INFORMAL-FALLACIES COMMITTED IN THE FOLLOWING ARGUMENTS. CIRCLE THE CORRECT ANSWER, BUT *IF NO FALLACY IS COMMITTED WRITE, "GOOD ARGUMENT".*
(Remember that an argument can be "good" in the sense of "deductively valid" or "inductively strong even if it contains a false premise)

1. No wonder teenagers do so poorly in school; they're all taking drugs. Three teenagers were interviewed by Donahue yesterday and each of them had tried marijuana and pills.

   Accident — Red Herring

   Hasty Generalization — Argument against the Person

2. Catherine badgered Michael and he died of a heart attack. I hope she feels guilty.

   Ad Hominem abusive — Accident

   Slippery Slope — False Cause

3. The judge has ruled that we are not paying our employees well enough. How can this be right when the judge's own secretary doesn't get payed well either?

   Appeal to Pity — Ad Hominem, tu quoque

   Begging the Question — Straw Man

4. All drugs affect the chemical balance of the body. Anything that affects the body's chemical balance is dangerous. Therefore, all drugs are dangerous.

   Missing the Point — Hasty Generalization

   False Cause — Appeal to the People, direct

5. It has been determined that twenty percent of the male students at O.U. are very good looking. Therefore, Larry, an OU student has a twenty percent chance of being very good looking.

   Appeal to vanity — Division

   False Cause — Missing the Point

6. An excellent piece of beef is a very rare thing these days. I guess I'll have to order a bad piece for myself since I like my meat well done.

Equivocation	Accident
Missing the Point	False dichotomy

7. This administration is not anti-Black, as has been alleged. There are many great Black individuals today, in business, in the arts, in sports. And Blacks played a major role in American history, if the real story were told.

Hasty Generalization	Missing the Point
Appeal to the People	Weak Analogy

8. Light Beer must be awfully good - so many famous sports figures have endorsed it in ads.

False Cause	Composition
Appeal to Ignorance	Appeal to Authority

9. The Bible is wholly true since it is the Word of God, and, as the Bible clearly states, God's word is Truth.

Begging the Question	Appeal to Authority
Straw Man	Suppressed Evidence

10. Each member of the Supreme Court holds conservative views on matters of the law. Therefore this supreme Court is conservative in its legal views.

Hasty Generalization	Accident
Composition	Equivocation

11. Injuring humans is morally wrong. Therefore, it would be wrong for me to injure a rapist who is attacking my wife.

Accident	Appeal to force
Division	Slippery Slope

12. It is never a good idea to permit teenagers to drive. Almost at once, they ask for the family car for a date. They have a few beers, and pretty soon they're in the back seat having sex. The girl gets pregnant and is forced into the horrendous decision whether to have an abortion, or to live her life as an unmarried mother.

Appeal to Ignorance	Slippery Slope
Ad Hominem abusive	Hasty Generalization

LOGIC 120 TEST

Unit 3

Name _____

Date _____

IDENTIFY THE INFORMAL FALLACIES COMMITTED IN THE FOLLOWING ARGUMENTS. CIRCLE THE CORRECT ANSWER, BUT IF NO FALLACY IS COMMITTED WRITE, "GOOD ARGUMENT". (Remember that an argument can be "good" in the sense of "deductively valid" or "inductively strong even if it contains a false premise).

1. Statistics show that women have a better, more discriminating sense of taste than men. Therefore, the one woman on this panel of winetasters will do a better job than any of her male companions.

   Division Composition

   Hasty Generalization Accident

2. Abortion is the killing of a human fetus. When one kills a human person, one commits a moral wrong. Therefore, abortion is a moral wrong.

   Bandwagon argument Weak Analogy

   Begging the Question False Cause

3. In answer to charges that their chemical plant did not provide fast enough warning of the toxic spill, Mr. Dow Dupont responded, "Our company has the best in-plant safety record of any chemical company, and the chemical industry on the whole has a much better record than many comparable industries."

   Equivocation Red Herring

   Straw Man Appeal to Authority

4. My watch is running slow. When I go jogging, therefore, I should leave it at home - it'll never keep up with me.

   Equivocation Complex Question

   Weak Analogy False Dichotomy

5. Most of the countries of the Middle East do not have the technical sophistication to produce complex weaponry like the F-20 fighter and the B-1 bomber. They need our assistance to bring their fighting arsenals up to the latest standards. It is therefore morally and diplomatically justifiable that we sell such weapons to the Middle East. (con't next page)

Argument from Ignorance Appeal to snobbery

Begging the Question Missing the Point

6. Sports figures are persons and Dwight Gooden is a great sports figure. Therefore, Gooden is a great person.

Appeal to Vanity Equivocation

Missing the Point Amphiboly

7. My office door is wide open. Either someone else has opened it while I was gone, or I forgot to close it when I left. But I distinctly remember locking it as I left. Therefore, someone else must have opened it.

Suppressed Evidence Weak Analogy

False Dichotomy Hasty Generalization

8. The ad reads: "Macallum Whisky - for those few who know the difference between a "scotch" and a fine single malt whisky. Available only through discerning fine wine and spirits merchants".

Appeal to authority Appeal to the People (snobbery)

Hasty Generalization Suppressed Evidence

9. No one in their right mind would think that Daniel Barenbom's piano playing is worth a damn. It figures that Dudley Blowhorn, the music critic of the Athens Messenger said that the concert was fantastic. Blowhorn's views are a joke - he's never said an intelligent thing about any concert he's reviewed. If he had an ounce of sense he'd resign his job and crawl into a piano!

Ad hominen-circumstantial Ad hominen-tu quoque

Ad hominen- abusive Ad Hominem - modus ponens

10. Many books have suggested that we have been visited by intelligent life from elsewhere in the galaxy, and that these visits explain many of the sightings of UFO's. Since no one has disproved the claim that intelligent alien life has visited us, we must conclude that it is true.

Ignoratio elenchi Argument from Ignorance

Suppressed evidence False Cause

11. I was, for selfish reasons, going to place my mother in a nursing home, when I could have cared for her at home. But before I could do so, she died unexpectedly. I've learned my lesson the hard way; God is punishing me for being so selfish by taking my mother away for good.

Appeal to Pity	Ad Hominem - circumstantial
Accident	False Cause

12. Jogging is very good exercise, and everyone should get exercise. Therefore it is a good idea for Herman, who had heart surgery last week to start jogging immediately.

Hasty Generalization	Division
Suppressed Evidence	Accident

LOGIC 120 TEST

Unit 3

Name _____

Date _____

IDENTIFY THE INFORMAL FALLACIES COMMITTED IN THE FOLLOWING ARGUMENTS. CIRCLE THE CORRECT ANSWER, BUT IF NO FALLACY IS COMMITTED WRITE, "GOOD ARGUMENT". (Remember that an argument can be "good" in the sense of "deductively valid" or "inductively strong even if it contains a false premise)

1. Each chapter of this book is short; consequently the book is short.

   Red Herring Composition

   Division Multiplication

2. Ralph Nader would have us install air bags in all of our new-model cars, claiming that this would make the cars safe. But no matter how many air bags you had under your dash board, if you are in a head-on collision going 85 mph you will die. It's unrealistic to believe that air bags will make you safe in such a situation, no matter who claims it - even Ralph Nader!

   Straw Man Red Herring

   Hasty Generalization Appeal to Authority

3. When asked by a customer whether, if they were to buy this new Electro-Suck vacuum, there will be any problem getting service from Vacuums Unlimited, the saleman responded, "We have been servicing Electro-Sucks for 12 years, and there has never been a problem. Past customers have always been happy with our promptness and completeness." The salesman conveniently failed to mention that Vacuums Unlimited was going out of business in three days. The salesman is guilty of :

   Accident Appeal to the People

   Fraud Suppressed Evidence

4. Nobody at singles bars is looking for a lasting relationship. Why, only last night, two women approached me obviously looking only for casual sex.

   Ad Hominen-circumstantial Appeal to Pity

   Hasty Generalization Post hoc ergo propter hoc

5. Of course Lowreal hair color is more expensive than other products, but I'm worth it. Buy Lowreal, because you're worth it too.

Appeal to Authority	Appeal to People - Snobbery
Missing the Point	False Cause

6. Witchdoctor to Tribesmen: "Everytime we're flooded by a monsoon, but sacrifice a virgin to Monty the Monsoon God the flood subsides and we're safe for many months. If we don't sacrifice Virginia soon, this flood will destroy us".

Hasty Generalization	Straw Man
Ad hominen-circumstantial	False Cause

7. Liberal Larry would have us require that all handguns be registered with the state for the protection of citizens against the misuse of guns, but I disagree for the following reasons. The gun is an important part of American history. Plains settlers could not have started homesteads without guns; our war-efforts could not have been successful without firearms, and every city dweller has the right to protect his family from harm. Larry is surely wrong in his opinion.

Missing the Point	Red Herring
Appeal to the People-vanity	Begging the Question

8. The salesman says that this discounted wine is an overlooked gem and a very good selection. But you have to take what he says with a grain of salt - he's just trying to move slow merchandise.

Appeal to People-snobbery	Division
False cause	Ad Hominen-circumstantial

9. Defense Attorney: " Your Honor, we recommend that you find our defendant not guilty of shoplifting. If the defendant has a criminal record, he will be fired from his job as a store manager, and this would leave his children and elderly mother without proper care and support".

Appeal to Authority	Appeal to Pity
Missing the Point	Slippery Slope

LOGIC 120 TEST

Unit 8

Name _____

Date _____

NOTE: In this and all following tests, you should read, p > q as a conditional, the > being taken as the hook or horseshoe symbol for the material conditional. Also, p . q should be read as a conjunction, p v q as disjunction, p ≡ q as the biconditional, and ~P as negation.

Answer the following questions.

1. Statements of the form, "p if q" and "p only if q" are both symbolized as p > q. True ___ False___

2. "p if q" says that q is a sufficient condition for p. True ___ False ___

3. If the two atomic statements contained in a biconditional (an equivalence) are both false, the biconditional is true. True ___ False___

4. If M is true and R is true, then M v R is true. True___ False ___

Determine whether each of the following is a correct or incorrect arrangement of symbols. If incorrect state why.

5. (~K v L) . (P . ~P) Correct ___ Incorrect ___

6. ~(H > G) v (≡ Q v S) Correct ___ Incorrect ___

7. (T > R v M) > Q Correct ___ Incorrect ___

8. [B > Q > (P.T)] > (S . L) Correct ___ Incorrect ___

Determine whether the following statements are basically negations, conjunctions, disjunctions, implications, or equivalences. Do this by circling the appropriate connective, called the main connective, in each case. For example, (R v S) > (T.P).

9. ~[(K v U) . D] > (J > G)

10. (D ≡ E) . Q

10. "When you love her enough to give her the very best, only diamonds will do"

False Cause	False Dichotomy
Equivocation	Tu quoque

11. Bogwan Rajneesh is a great leader, a man of innocence, and man of rules. He would never violate any of the laws of the United States. Therefore, Rajneesh did not evade Federal Income Tax laws, as was reported.

Begging the Question	Missing the Point
Appeal to Authority	Weak Analogy

12. The actor, Lorne Green said on the TV that the best medical protection for those over 65 is the Mega-Maxi medical plan from Bullchip Mutual Trust. This surely is the best plan, then.

Appeal to People-Snobbery	Suppressed Evidence
Appeal to Authority	Accident

11. $\sim[(R \supset G) \vee (P \cdot H)]$

12. $Z \cdot [(T \vee T) \supset (S \cdot Q)]$

Translate the following English sentences into symbolic form. Try to select letters which relate obviously to the atomic sentences they symbolize. Make sure a different letter is assigned to each different atomic sentence.

13. If Libya is supporting Middle-East terrorists, then both the U.S. and Israel are likely to invoke economic sanctions.

14. If both the Athens airport is bombed and the Munich airport is seized, travel to Europe will be unsafe.

15. Either California slips into the ocean or Mt. St. Helens erupts again, and both Nevada becomes a coastal state and Oregon becomes an island.

16. France stops growing wine if and only if the Spanish stop growing olives if the Italians cease making pasta.

17. Neither Turkey nor Norway are mountainous; however, Sweden is moutainous only if Austria is.

Assuming that A, B and C are true and that X, Y and Z are false, determine the truth-value of the following sentences.

18. $(A \cdot Z) \vee (C \supset B)$ True ___ False ___

19. $\sim(B \equiv X) \supset (A \cdot Y)$ True ___ False ___

20. $[(A \cdot B) \cdot (C \vee Z)] \vee (X \equiv A)$ True ___ False ___

LOGIC 120 TEST

Unit 8

Name: _____

Date _____

NOTE: In this and all following tests, you should read, p > q as a conditional, the > being taken as the hook or horseshoe symbol for the material conditional. Also, p . q should be read as a conjunction, p v q as disjunction, p ≡ q as the biconditional, and ~P as negation.

Answer the following questions.

1. Statements of the form, "if p then q" and "p only if q" are both symbolized as p > q. True ___ False___

2. "p only if q" says that q is a necessary condition for p. True ___ False ___

3. The only condition under which p > q is false is when p is false and q is true. True ___ False___

4. If M is true and R is false, then M . R is true. True___ False ___

Determine whether each of the following is a correct or incorrect arrangement of symbols. If incorrect state why.

5. (~K v (L) v (P . ~P) Correct ___ Incorrect ___

6. ~(H ≡ G v Q) > S) Correct ___ Incorrect ___

7. T > (R v M) > Q Correct ___ Incorrect ___

8. [B (Q > (P.T))] Correct ___ Incorrect ___

Determine whether the following statements are basically negations, conjunctions, disjunctions, implications, or equivalences. Do this by circling the appropriate connective, called the main connective, in each case. For example, (R v S) > (T.P).

9. L v [(L . Z) > T]

10. ~[(D ≡ E) ≡ Q]

11. $(B > H) > \sim(U \cdot Z)$

12. $(A > Z) \cdot [(T \equiv \sim T) > S]$

Translate the following English sentences into symbolic form. Try to select letters which relate obviously to the atomic sentences they symbolize. Make sure a different letter is assigned to each different atomic sentence.

13. Either England or France will not drop out of the EEC if Hungary and New Zealand are not admitted.

14. If travelling at high speeds is dangerous then travelling at the speed of light is deadly if and only if light travels fast.

15. If both Microbiology is fun and Zoology is a riot then Botany's being a bed of roses is sufficient for Chemistry's being a gas.

16. If either the newspaper is biased or the television is a wasteland then both book reading and class attendance are necessary conditions for Harry's getting a rounded view of world affairs.

17. Quiche is good if the crust is light, provided that you don't eat too much.

Assuming that A, B and C are true and that X, Y and Z are false, determine the truth-value of the following sentences.

18. $(X > C) > Z$ True ___ False ___

19. $(X \cdot C) > Z$ True ___ False ___

20. $X > (C > Z)$ True ___ False ___

LOGIC 120 TEST

Unit 8

Name _____

Date _____

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2. "p if q" says that q is a necessary condition for p. True ___ False ___

3. The only condition under which p > q is true is when p is true and q is false. True ___ False___

4. If M is true and R is false, then M ≡ R is true. True___ False ___

Determine whether each of the following is a correct or incorrect arrangement of symbols. If incorrect state why.

5. (K v ~ L) v (P . ~P) Correct ___ Incorrect ___

6. ~H ≡ (G v Q) > S) Correct ___ Incorrect ___

7. T > R v (M > Q) Correct ___ Incorrect ___

8. [J v U] . [G > (P ≡ T)] Correct ___ Incorrect ___

Determine whether the following statements are basically negations, conjunctions, disjunctions, implications, or equivalences. Do this by circling the appropriate connective, called the main connective, in each case. For example, (R v S) ⊃ (T.P).

9. [L v (K v J)] . (S v D)

10. $\sim(D > E) \equiv Q$

11. $(K > H) > \sim[(U \cdot Z) > (H \cdot F)]$

12. $(A > Z) > (T \equiv \sim T)$

Translate the following English sentences into symbolic form. Try to select letters which relate obviously to the atomic sentences they symbolize. Make sure a different letter is assigned to each different atomic sentence.

13. If roses are red, then if violets are blue then sugar is sweet and so are you.

14. Coffee contains caffeine on condition that Pepsi contains caffeine, and Milky-Ways contains chocolate if Gatorade tastes like dishwater.

15. If one acts if and only if one finds the act pleasurable then one runs into a burning building to save a child only if it is pleasurable to endanger yourself.

16. You do not pass this test unless you symbolize this sentence correctly.

17. If Mary goes to the party she will either enjoy herself and talk to me or, if Fred is there, she won't say a word.

Assuming that A, B and C are true and that X, Y and Z are false, determine the truth-value of the following sentences.

18. $(X > C) \equiv (Z > C)$ True ___ False ___

19. $(\sim X \vee C) \equiv (X > C)$ True ___ False ___

20. $(Y \cdot A) \vee [(C \cdot X) \cdot (Z \vee Z)]$ True ___ False ___

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